Completed Return on Investment Project Case Study

United States Department of Energy
Office of Environmental Management
Fact Sheet

Oven Cleans Lab Glassware

Los Alamos National Laboratory

Original Problem

Organic synthesis laboratories generate glassware covered with organic residue. Oxidizing acids or solvents were required to remove the organic residues. Manual cleaning did not always completely remove the residue, and dirty glassware could contaminate future experiments. Employees were exposed to chemicals during the manual cleaning process that could cause negative health impacts. All of the cleaning chemicals and rinse water were treated as hazardous waste. Repeated handling of wet glassware during the cleaning process increased the risk of breakage.

The Project Solution

The Applied Chemical Technology Group purchased a high-temperature Pyro-Clean oven from Tempyrox that cleans lab glassware using heat. The heat decomposes all kinds of organic compounds such as polymers, resins, and tars without affecting glass. Organic vapors in the exhaust are destroyed by a catalytic oxidizer system.

Value of Improvement

The oven uses heat to remove organic residues completely and uniformly from the glassware. No liquid hazardous waste is produced, and organic vapors are destroyed inside the oven. Loading and unloading the oven is a quick process. Cleaning glassware with the oven requires over 50% less rinse water. The oven is expected to prevent the generation of about 50 kg of hazardous waste per year and save approximately 100 hours of staff time.

Lifecycle Waste Reduction	
Lifecycle Waste Reduction	~50kg acids + solvents /year
Commencement Date	2002
Project Useful Life (Years)	10

DOE Monetary Benefits	
Total Project Cost	$17,000
Lifecycle Savings	~100 hrs labor /yr
Return on Investment	84%

Benefits At-A-Glance

- About 50kg of waste cleaning solvents and acids are now avoided.
- The staff is happy to save about 100 hours per year by not cleaning glassware manually anymore.
- Less risk of glassware breakage, and less exposure to chemicals for the staff.

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	Summary Data
Priority Area:	Waste Minimization Projects
Project Type:	Process Improvement
Total Project Cost:	$17,000
Lifecycle Savings:	~100 hours of labor per and disposal of ~50kg of hazardous waste per year.
Implementing Group:	Applied Chemical Technology Group
Benefiting Group:	Applied Chemical Technology Group
Useful Life Years:	10
Return on Investment:	84%
Lifecycle Waste Reduction:	~50kg of cleaning solvents and acids annually.
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